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ADP SYSTEMS

VA Actions to Improve Management of Information Resources

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The Honorable Alan Cranston
Chairman, Committee on Veterans' Affairs
United States Senate

The Honorable G.V. (Sonny) Montgomery
Chairman, Committee on Veterans' Affairs
House of Representatives

This report discusses actions taken by the Veterans Administration (VA) in response to concerns and recommendations that we raised in three recent reports on its information systems and information resources management activities.[1] We have prepared this report to summarize the status of VA's actions addressing our concerns and recommendations because of your past interest in our work at the agency. We limited the scope of our review to determining the actions VA has made in implementing our recommendations, without conducting a detailed verification or assessment of these actions.

In July 1987 we reported on the need for improved management of the Decentralized Hospital Computer Program (DHCP) in the areas of software development, security, and capacity management.[2] Since then, VA has established software development procedures and controls, conducted risk analyses and contingency planning for facilities, and restricted the release of sensitive software in response to our recommendations. While not yet fully implemented, it has also taken action toward establishing a capacity management program for DHCP and has been developing software to provide for efficient user access to patient data.

In October 1987 we reported on the need to better justify and conduct additional analyses for the Department of Veterans Benefits Modernization Program.[3] In response, VA has published detailed guidelines to control new information system development projects, including centralized

[1]The Veterans Administration was elevated to cabinet-level status as the Department of Veterans Affairs on March 15, 1989. In this report, it is referred to as the Veterans Administration since that is how it was known during our review.

[2]Hospital ADP Systems: VA Needs to Better Manage Its Decentralized System Before Expansion (GAO/IMTEC-87-28, July 24, 1987).

[3]ADP Systems: Department of Veterans Benefits Modernization Program (GAO/IMTEC-88-3, Oct. 30, 1987).

review and oversight. The agency is using these guidelines to justify the modernization program and interim projects.

Finally, in January 1988 we reported on several aspects of VA's management of its information resources, including the need for increasing data sharing among systems, justifying its major telecommunications procurement, and exploiting opportunities for centralizing automated data processing (ADP) training.[4] In response, VA reviewed and revised its requirements and conducted a cost/benefit analysis prior to releasing a request for proposals for a replacement telecommunications network. The agency has also taken several important steps to promote data sharing to address redundant data collection and data entry among departmental information systems, and has made efforts to exploit opportunities for centralizing certain aspects of its ADP training.

Background

VA provides service to veterans through three departments—Medicine and Surgery, Veterans Benefits, and Memorial Affairs. Historically, the three departments have operated largely autonomously, with limited central controls.

The Department of Medicine and Surgery provides medical care through some 195,000 employees at over 500 facilities nationwide, at a cost of $10.7 billion annually. Its facilities are organized into seven regions. DHCP, which started in 1982, is intended to provide a single, modern, state-of-the-art information system to support the efficient delivery of quality care at VA hospitals and clinics.

The Department of Veterans Benefits administers benefit programs for pensions, compensation, education, and home loan guarantees through its 58 regional offices. Its 13,000 employees provide $16.3 billion in benefits annually. The department started the modernization program in 1986 to increase the efficiency of VA's administration of benefit programs and improve service to veterans. The program is intended to replace existing software—much of which was developed during the 1960s and no longer meets requirements—with modern software and computers.

The Department of Memorial Affairs maintains a system of national cemeteries and provides burial services in these locations, as well as

[4]Information Systems: Veterans Administration Information Resources Management Is Improving (GAO/IMTEC-88-17, Jan. 27, 1988).

headstones for deceased veterans in private cemeteries. It has a much smaller number of employees and budget than the other departments—1,200 employees and an annual budget of $50 million.

Control Processes for DHCP Are Being Implemented

VA has issued policies and procedures to strengthen controls over the software development process, conducted risk analyses and contingency planning to improve security, and issued and implemented guidelines restricting release of DHCP software to protect sensitive patient data. It has not as yet, however, improved DHCP software to allow for efficient user access to patient data or established policies for monitoring system utilization and assessing computer capacity VA-wide to better determine hardware requirements.

VA has issued policies and procedures strengthening DHCP software development controls. We recommended these controls to reduce the problems associated with numerous errors in software released prior to our July 1987 report. In October 1987 the Department of Medicine and Surgery issued a circular establishing a formal software verification process for all new software releases. The purpose of verification is to increase assurance that the software and documentation are correct. The verification process is conducted by a facility independent of the one that develops the software.

In March 1988 the Department of Medicine and Surgery issued policies, procedures, and guidelines that require a formal process of alpha and beta testing. Alpha testing is a developmental test generally conducted at a single VA medical center, while beta testing is an operational test of the proposed software in a representative range of facilities. Agency policy dictates that only after alpha and beta testing, verification, and peer review are completed will new software be available for implementation at all facilities.

In response to our noting that VA had not conducted risk analyses and contingency planning for DHCP sites, as required by Office of Management and Budget Circular A-130, VA issued a revised computer security circular on July 12, 1988, that required that a risk analysis be conducted at every DHCP facility and contained a suggested reporting format. The field activities we visited during this review had conducted risk analyses and begun contingency planning in response to the circular. VA's recently issued contract for new computers, maintenance, and other services at VA facilities also addresses contingency planning by providing for emergency services including replacement of damaged equipment in

cases of natural disasters, fires, and other situations that could disable computer systems.

Prior to our DHCP review, the agency had released copies of the DHCP software to the public containing security information that could increase the risk of unauthorized access to the patient data base. In response to our recommendation, VA has instituted new controls over the release of DHCP software to the public. Its general counsel ruled that Freedom of Information Act exemptions, 5 U.S.C. 552 (Supp. IV 1986), permit withholding security-sensitive portions from public release. VA issued a circular on this policy in October 1987. According to agency records, about 170 copies of the DHCP software with the sensitive portions removed were distributed to the public from January 1987 through October 1988. VA officials said that since December 1986 they have not provided copies of the software containing security information to the general public.

We also recommended that VA modify the DHCP software so that data can be efficiently accessed by system users. DHCP software modules were originally designed to support individual hospital departments, such as pharmacy and laboratory, and do not allow for easy access to a patient's full record. To gain access to a patient's full record, medical personnel are forced to sequentially access each departmental software module. To address this problem, VA has been developing order entry/results reporting software, which is intended to provide the user with easier access to the various medical modules. This software—the key to the integration of patient information—will allow DHCP users to interact with patient data files without first going through each departmental module.

However, this software has not been completed. As of December 1988 the existing software was undergoing developmental testing at the VA medical centers in Washington, D.C., and Salt Lake City, Utah. The agency expects the initial release of this software to occur during the summer of 1989. DHCP facilities will only be able to install this software after upgrading their hardware and installing recently completed DHCP application modules for dietetics, radiology, nursing, and surgery. The agency anticipates developing subsequent releases of the order entry/results reporting software to provide additional needed functions already identified.

We recommended that VA establish policy and procedures for regularly monitoring system utilization and assessing computer capacity agency-wide to better determine hardware requirements. In response, VA has

taken several actions to develop a system utilization and capacity management program for DHCP. However, these actions were not responsive to the intent of our recommendation that actual system utilization data be used in determining its hardware requirements, rather than relying solely on the results produced by its automated model. VA's automated model projects medical centers' capacity needs solely on the basis of assumptions derived from a variety of sources, including estimated work load data and input from user groups, software developers, and medical center directors. After discussing the need to consider actual system utilization data with us, VA officials assured us that they would use available system utilization statistics during future phases of the major hardware upgrade currently underway.

Federal Information Resources Management Regulation 201-30 (Management of ADP Resources) requires the routine collection and analysis of detailed capacity management data to measure current computer use and needs, and to predict future capacity requirements.[5] VA issued a circular requiring individual hospitals to report system utilization data every 6 months to their regional information systems center. The circular requires the information system centers to use these data to assess system utilization at individual facilities. These data are intended for use in planning for equipment redistribution as part of the major systems replacement and upgrade program. However, VA Central Office officials told us that they were not using individual site system utilization statistics but were relying solely on the results of the automated model to guide the current hardware upgrade, expected to cost $145 million through 1996.

Improved capacity management is important to VA because many sites are experiencing capacity problems that preclude the implementation of available application modules. For example, out of 164 medical centers surveyed by the Central Office in December 1988, 114 were not running all or part of the nursing module, and 62 were not running all or part of the radiology module, due to capacity problems. These capacity problems could have been forecast had an effective agency-wide system utilization and capacity management program been established and implemented to routinely analyze actual system utilization trends in the medical centers.

[5]Capacity management activities include collecting and analyzing detailed performance (system utilization) data on current computer processing, and comprehensive modeling and pilot testing of planned computer systems.

VA has initiated action in several other areas for its capacity management program. First, it has entered into an interagency agreement with the General Services Administration's Federal Systems Integration and Management Center (FEDSIM) to provide a variety of computer capacity management studies and tools for a total estimated cost of $748,000. Second, agency officials told us that they have completed and verified an automated data base of existing equipment in the data centers at each facility. Agency officials stated that they still need to verify the automated data base of other ADP equipment, such as printers and terminals, that is located throughout VA facilities.

Procedures Developed and Needed Analyses Being Conducted for the Department of Veterans Benefits Modernization Program

In our October 1987 report on VA's Department of Veterans Benefits Modernization Program, we recommended that the agency (1) develop specific goals and objectives against which program progress could be measured, and (2) ensure that the chosen solution is based on a documented analysis of the costs and benefits of different alternatives. The agency developed measurable goals and objectives to guide its revised modernization program, and in April 1988 restructured its approach to the modernization program to provide for a full cost/benefit analysis of alternatives prior to making a deployment decision. To date, VA has completed cost/benefit analyses of alternatives for 10 of its 13 proposed interim projects pending the implementation of the modernization program.

Action Taken to Improve Other Information Resources Management Activities

Our January 1988 report discussed several areas of VA's management of its information resources that needed improvement: (1) information systems could not efficiently share needed data, and duplicative data were being maintained; (2) the agency had not conducted required analyses and justification for its future telecommunications needs; and (3) it had not explored cost-savings opportunities in ADP training.

VA has undertaken three major activities designed to improve data sharing and reduce the amount of duplicate data entry that occurs when the same data are maintained in different systems or subsystems among its departments. First, VA has established a high-level committee—the Systems Integration Review Board—to review major system development actions and to identify opportunities for data exchanges among agency information systems. Second, it has begun a project to automate the exchange of needed data between the Department of Veterans Benefits and the Department of Medicine and Surgery. Third, as part of its Department of Veterans Benefits Modernization Program, the agency

established a goal of reducing redundant data entry in this system by 60 percent by 1992 by modifying software and procedures. If these efforts are successful, the agency could significantly reduce the problem of duplicate data collection and entry.

In our January 1988 report we expressed concern that VA's procurement of a replacement telecommunications network, called the Integrated Data Communications Utility, was being conducted without considering the quantitative and qualitative effects of major system redesigns, such as the Department of Veterans Benefits Modernization Program, which the agency had planned and underway. VA responded by reassessing its requirements for telecommunications, considering major system redesigns, and incorporating them in its request for proposals on June 15, 1988. It also completed a cost/benefit analysis of the telecommunications procurement in February 1988.

Finally, VA responded to our concern that it had not adequately explored cost savings through centralizing ADP training activities. It prepared curriculum materials for three courses in its office automation system that are available upon request for use by regional offices administering benefit programs and VA has plans to develop additional courses. At the time of our review, one regional office had requested these training materials. It also provided several different training classes to field personnel during 1988.

Objective, Scope, and Methodology

Because our previous three reports focused on the development and implementation of internal controls and management reporting for its major system development activities, the objective of this review was to determine the actions taken by VA in addressing our recommendations and concerns.

We obtained policies, procedures, and guidelines issued by VA's Central Office in Washington, D.C., in response to our recommendations, and available information concerning their implementation. We interviewed Central Office officials responsible for developing these policies, procedures, and guidelines and those implementing them at the Central Office, the Western Region of the Department of Medicine and Surgery (including the San Francisco Information Systems Center and VA Medical Centers in San Francisco and Martinez, California), and the VA Medical Center in Washington, D.C. We also met with officials from the Department of Veterans Benefits' San Francisco Regional Office. We chose

offices in the San Francisco area because they support a variety of VA medical and benefit programs.

During the course of our current review, we discussed the results of our work with VA officials responsible for the activities being examined. We have incorporated their comments in the report, as appropriate. We did not obtain official agency comments on a draft of this report.

We conducted our review in accordance with generally accepted government auditing standards, from September 1988 through February 1989.

Conclusions

VA has taken a number of actions to address the recommendations and concerns we have previously reported. The agency has issued policies and procedures strengthening DHCP software development controls, restricting the release of security-sensitive portions of software, and conducting risk analyses and contingency planning, and is in the process of developing software to allow for easier access to patient data. VA has also established measurable goals and objectives to guide its revised Department of Veterans Benefits Modernization Program and established procedures requiring full cost/benefit analysis of alternatives. The agency has also initiated efforts to increase data sharing, conducted required analyses for its telecommunications procurement, and explored cost-saving opportunities in centralizing ADP training.

However, VA had not fully implemented our prior recommendation to develop an effective system utilization and capacity management program agency-wide by using detailed utilization statistics available from individual sites to better determine hardware needs for its $145-million hardware upgrade. After discussing this issue with VA officials, they agreed to use available system utilization statistics along with the results of its automated model for future phases of the major hardware upgrade currently underway. Along with its actions to assist sites with capacity management on an individual basis, completing an accurate inventory of equipment, and the technical assistance of FEDSIM, VA's actions now appear responsive to our earlier recommendation.

We are sending copies of this report to the Secretary of Veterans Affairs; the Director, Office of Management and Budget; and other interested parties. We will also make copies available to others upon request.

This report was prepared under the direction of Melroy D. Quasney, Associate Director. Other major contributors are listed in appendix IV.

for Daniel C. White

Ralph V. Carlone
Assistant Comptroller General

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Abbreviations

ADP	automated data processing
DHCP	Decentralized Hospital Computer Program
FEDSIM	Federal Systems Integration and Management Center
GAO	General Accounting Office
IMTEC	Information Management and Technology Division
VA	Veterans Administration

Control Processes for DHCP Are Being Implemented

For the Decentralized Hospital Computer Program (DHCP), we recommended in July 1987[1] that VA

- implement controls over the software development process,
- conduct risk analyses and contingency planning for its information centers in VA medical centers and other locations to improve security,
- implement a policy to restrict release of DHCP software (including security information) to protect sensitive patient data,
- improve the DHCP software to allow for efficient user access to patient data, and
- establish policies and procedures for monitoring system utilization and assessing computer capacity VA-wide to better determine hardware requirements.

While VA has substantially implemented the first three recommendations, additional attention needs to be given to the last two.

VA's goal with DHCP was to develop a totally integrated medical center information system built around a local data base of patient and administrative information.[2] The data base in each medical center is planned to support local management needs, as well as meet agency-wide management needs through aggregation of data to regional and headquarters levels.

VA began developing DHCP software in 1982 and procuring the hardware in 1983. Through this program, 169 medical centers, which include a total of 225 facilities, received initial software modules for both patient and administrative data during 1984 and 1985. In 1987 the agency estimated that DHCP would cost about $925 million to support and expand over a 10-year life cycle.

VA's seven regional information systems centers are responsible for developing DHCP software and providing technical assistance to 169 VA medical centers. The seven information systems centers are incrementally developing modules using a prototyping approach. The list of planned modules for the full DHCP has been made less ambitious. The current approved program includes 14 modules (6 core modules and 8 enhanced modules), whereas up to 51 modules had been previously

[1]GAO/IMTEC-87-28, July 24, 1987.

[2]VA uses the term "integrated" to describe a computer system (hardware and software) that uses common file structures, data files, system utilities, and methods of user interface, and links information processing functions such as patient care, administrative operations, and management support.

planned. As of December 1988, all six core and six enhanced modules had been completely developed, tested, and verified. According to agency records, due to hardware limitations, some VA medical centers have had to forestall implementation of some of the 12 completed modules. In addition, the order entry/results reporting software that provides users with more efficient access to patient data is still being developed and tested. This software provides the capabilities the agency needs to make DHCP an integrated system. Accordingly, VA designated this software development effort as its highest software priority. Until this software is available for installation, DHCP will function as independent application modules rather than the integrated system VA desires.

DHCP Software Controls Have Been Implemented

Our DHCP report cited the lack of sufficient controls over the software development process. Our review disclosed that VA did not follow federal guidelines when documenting, testing, and approving software before it was released. Without such controls, software was developed that (1) was prematurely released, requiring multiple corrections; and (2) is susceptible to undetected errors.

VA responded to our recommendation by issuing several policy statements, procedures, and guidelines to institute controls over the testing and release of software. It issued Circular 10-87-123, DHCP Software Verification Policy and Guidelines, on October 23, 1987, and Software Management Policy and Software Management Procedures and Guidelines for DHCP on March 31, 1988. The verification policy addresses the last step in the software development process. The software management policy and guidelines incorporate by reference the verification policy and address software management standards and requirements for the development, maintenance, and support of all software for national distribution.

VA's software development process includes the following five phases:

- functional requirements/design,
- prototype/development,
- testing,
- pre-verification (performed by the developing information systems center), and
- verification (performed by a different information systems center).

The DHCP Software Verification Policy and Guidelines circular defines the verification process for DHCP software and assigns responsibilities

for that process. The verification process is intended to determine if software and documentation meet the functional and technical requirements necessary to be successfully implemented in all VA medical centers, regardless of size and complexity. Documentation verification is a review of all documentation for thoroughness, accuracy, readability, and adherence to documentation standards. Functional verification is intended to ensure that the software works correctly in a VA medical center. Technical verification is an audit of the software for adherence to programming standards and conventions. The circular requires that any discrepancies in documentation, functionality, and technical deficiencies and errors be reported to the developing information systems center.

When the verification is complete, the circular requires a summary report of the testing and verification process, including methods, problems encountered, testing environment, and any remaining unresolved issues. If the report receives concurrence from the director of the Medical Information Resources Management Office and program office officials, the information systems center that developed the software distributes it to the other information systems centers, which load and test the software prior to release to VA medical centers.

The Software Management Policy and Software Management Procedures and Guidelines govern the software development process for DHCP. These documents lay out a minimum framework for the development, maintenance, and support of DHCP software packages for use at VA medical centers and other health care facilities. The purpose of these documents is to provide

- a basic software management structure that applies to every DHCP software package designated for national distribution,
- a standard for DHCP software management,
- a standard by which field activities can be assured that software has been adequately developed and tested, and
- a standard for providing support to the field.

These documents designate responsibility for each of the activities required during the life cycle of a DHCP software package. The responsibilities are assigned to the various components of VA's software development activities, including the development information systems center, special interest user group, and VA Central Office program office

involved with each software package. They also provide for central control over the DHCP data base structure through a DHCP data base administrator.

VA's new procedures and guidelines provide that a number of different quality controls and checks be built into the software life cycle. Among them is a peer review convened by the data base administrator when the developing information systems center has produced a functional prototype of a major version of a software package. In addition, each package is evaluated during developmental (alpha) testing. Formal reporting of alpha test results is required, including details about the completeness of the test.

DHCP software management policies also provide for operational (beta) testing. The primary goal of beta testing is to measure and enhance the use of a software package at other VA sites. The second purpose is to identify problems and subsequently to test the associated resolution. Multiple beta test sites are required to provide information on diverse environments, including facilities of various sizes. As with alpha testing, formal reporting of test results—including assessments of level of use, accuracy, usefulness, and completeness—is required.

Security Circular Mandates Risk Analyses and Contingency Planning

In July 1987 we recommended that VA continue to report the lack of risk analyses and contingency plans as material control weaknesses under the Federal Managers' Financial Integrity Act, 31 U.S.C. 3512(b) and (c). In its response, VA recognized this deficiency and stated that it was reviewing a new security circular mandating contingency planning and containing a generic risk assessment guide. While VA expected to issue the new circular in October 1987, the circular was not issued until July 12, 1988. The field activities we visited during this review had conducted risk assessments and begun contingency planning in response to the circular.

On July 12, 1988, VA issued Department of Medicine and Surgery Circular 10-88-78 requiring DHCP facilities (hospitals and information systems centers) to conduct risk analyses and contingency planning. At two of the facilities we visited, ADP security officers pointed out that their risk assessments had identified several vulnerabilities requiring correction by medical center management. As the risk assessments had only recently been completed, action by management to correct these vulnerabilities had not yet been taken.

VA's contract for new computers, maintenance, and other services, issued March 14, 1988, also addresses ADP risks and contingency planning. Specifically, it provides for emergency service in cases of natural disasters, fires, and other situations that could disable the computer systems at VA facilities. For example, the contract provides for emergency services—including the rapid replacement of damaged equipment—in the event of major damage to VA computer facilities. Individual facilities are still responsible for ensuring that contingency plans are developed for a variety of less threatening situations. Until these efforts are complete, VA officials told us, they intend to continue to report these areas as material control weaknesses.

VA Limits Distribution of DHCP Software Containing Security Controls

In July 1987 we recommended that VA issue a policy to restrict release of DHCP software (including information that could compromise security) under the Freedom of Information Act in order to protect sensitive patient data. We recommended this action because VA's policy for complying with the Freedom of Information Act allowed the release of information that could increase the risk of unauthorized access to the patient data base. Under a January 1982 decision by the Administrator of Veterans Affairs, VA was distributing copies of the DHCP software and documentation with this information.

During our review leading to the July 1987 recommendation, we brought this issue to the attention of both the VA Inspector General and VA program officials. Following these discussions, agency officials in June 1986 asked VA's General Counsel to reassess this issue. In November 1986 the General Counsel ruled that existing Freedom of Information Act exemptions permit withholding security-sensitive information from public release. The opinion indicated that in the course of protecting the privacy of VA data related to medical care and maintaining the integrity of hospital data systems, it would be acceptable for the agency to withhold all or portions of DHCP software. As a result, VA changed its software release practices and on October 23, 1987, issued Department of Medicine and Surgery Circular 10-87-122, Distribution of Department of Medicine and Surgery Developed DHCP Software. This circular formalized modified release practices, responding to our recommendation. The circular balances the needs of supporting the Freedom of Information Act against the best interests of VA. It directs that one version of DHCP software be available for the public, with sensitive information deleted, and that a second version, complete with all sensitive information, be retained for internal use.

The circular assigns responsibility for monitoring compliance with the departmental security officer. It assigns responsibility to the health care facility site manager for ensuring that all DHCP software is secured and maintained in a manner that will guard against its unauthorized duplication and distribution. The circular provides that the director of the Medical Information Resources Management Office be the responsible official for designating software as sensitive or public domain. It also centralizes responsibility for all external distribution of DHCP software and documentation responding to requests from within the United States to a single location, the information systems center at Hines, Illinois. According to agency records, from January 1987 through October 1988, the Hines center distributed about 170 copies of the public domain version of DHCP.

Development of the Order Entry/Results Reporting Software Is Not Complete

We previously recommended that VA ensure that data requirements are defined and incorporated in the DHCP modules so that the data can be efficiently accessed by system users. In response, VA made development of the order entry/results reporting software the highest priority of its information systems centers. However, this software is not yet fully developed. When developed, it could provide users with efficient access to data, with easy-to-learn instructions.

The order entry/results reporting software is an extension of current DHCP application modules. It is the key to the integration of patient information and is intended to provide the user with easier access to the various medical modules incorporated within the DHCP system. The software will allow users of DHCP to interact with the patient data files without first going through each application module.

As of December 1988, the order entry/results reporting software was undergoing alpha testing at the Salt Lake City, Utah and Washington, D.C. medical centers. VA expects pre-verification of the software to be completed in February 1989, and will conduct beta testing at several other sites later in 1989. VA expects the initial release of the software to be available for implementation during the summer of 1989. A significant amount of development work remains to be done on the software. Specifically, future software releases are planned to provide the following features:

- providing access to software modules on the basis of an individual's system authorization;

- electronic signature for authorizing drugs, laboratory tests, radiology reports, etc.;
- order set capabilities (where groups of medical procedures can be ordered through a single command);
- the ability to create user-defined menus (for example, a list of frequently prescribed medications for a physician to select in treating certain types of patients); and
- the introduction of "alerting" functions to alert physicians to significant changes in patient status requiring follow-up or special consideration, or to information that is pertinent to future diagnostic or therapeutic decisions (such as allergies, where prescribed treatments may cause side effects).

VA expects that DHCP facilities will implement this software after upgrading their hardware capacity and implementing enhanced DHCP application modules—dietetics, radiology, nursing, and surgery. This increased capacity is required to handle the additional work load generated by this software.

VA-wide Capacity Management Program Initiated

In our July 1987 report we recommended that VA establish policy and procedures for regularly monitoring system utilization and assessing computer capacity agency-wide to better determine hardware requirements. VA has taken several actions to improve capacity management at its individual facilities, such as developing a centralized data base of existing equipment configurations, collecting and analyzing systems utilization data, preparing system tuning guides, and designating the information systems centers to provide technical support to VA medical centers. However, these actions did not address our recommendation that VA use actual system utilization data in determining its hardware requirements rather than relying solely on the results produced by its automated model.[3]

In its comments contained in our July 1987 report, VA indicated that it was working with a contractor to develop an automated inventory and tracking system for ADP equipment. Such an inventory would also describe existing capacity. During our current review, agency officials

[3]VA's automated model projects medical centers' capacity needs solely on the basis of assumptions derived from a variety of sources, including estimated work load data and input from user groups, software developers, and medical center directors.

said that the contract had been allowed to expire and that VA was completing the inventory in-house. They said that an inventory of equipment in the computer rooms had been completed and reconciled but that an inventory of other ADP equipment—such as printers and terminals—distributed around the facility had not.

Federal Information Resources Management Regulation 201-30 (Management of ADP Resources) requires the routine collection and analysis of detailed capacity management data to measure current computer use and needs, and to predict future capacity requirements.[4] In response to our recommendation, VA issued Department of Medicine and Surgery Circular 10-87-119, DHCP System Performance Management, dated October 23, 1987, establishing procedures for regional monitoring of individual medical center system performance.

The circular requires DHCP facilities to send specified system utilization reports every 6 months to their information systems center, which uses them to assess system utilization. At the San Francisco center, system utilization reports from the medical facilities in its region had been received, reviewed, and analyzed, except when technical problems prevented creating the reports. VA has also taken action to assist sites in improving their individual systems' performance through the preparation and distribution of a DHCP System Tuning Guide.

In addition, the circular indicates that the information systems centers are to use the individual site utilization data to assist in plans for equipment redistribution as part of the major systems replacement and upgrade program now underway. However, VA Central Office officials told us that they were not using individual site system utilization statistics from the regions to guide their $145-million hardware upgrade program extending through 1996. They were relying solely on the results of an automated model developed to forecast equipment requirements. After discussing this issue with VA officials, they agreed to use available system utilization statistics along with the results of the automated model for future phases of the major hardware upgrade currently underway.

Improved capacity management is important to VA because many sites are experiencing capacity problems that preclude the implementation of

[4]Capacity management activities include collecting and analyzing detailed performance (system utilization) data on current computer processing, and comprehensive modeling and pilot testing of planned computer systems.

available application modules. For example, out of 164 medical centers surveyed by the Central Office in December 1988, 114 were not running all or part of the nursing module, and 62 were not running all or part of the radiology module due to capacity problems. These capacity problems could have been forecast had an effective agency-wide system utilization and capacity management program been established and implemented to routinely analyze trends in the facilities' system utilization.

To assist it in developing a capacity management program, VA has entered into an interagency agreement with the General Services Administration's Federal Systems Integration and Management Center (FEDSIM) to develop a central capacity management program for a total estimated cost of $748,000. The current agreement calls for FEDSIM to develop performance management procedures, evaluate VA's modeling software, and evaluate and recommend how the agency can merge its performance management and capacity planning functions into a cohesive capacity management program.[5]

[5]Performance management involves analyzing the performance of a computer system to determine how resources are currently utilized and how such utilization can be improved. Capacity planning assists in forecasting computer resource requirements to ensure that capacity exists when needed.

Procedures Developed and Needed Analyses Being Conducted for the Department of Veterans Benefits Modernization Program

For the Department of Veterans Benefits Modernization Program, we recommended that VA complete analyses to (1) develop specific goals and objectives against which program progress can be measured and (2) validate that the chosen solution is optimal and based on a documented analysis of alternatives that clearly lays out the costs and benefits of each approach.[1] VA restructured its approach to this program to provide for a full analysis of alternatives, including cost/benefit analysis, prior to making a deployment decision under a revised plan. As part of this revised plan, issued in April 1988, VA developed measurable goals and objectives to guide its revised modernization program and is pursuing 13 interim projects pending the implementation of the modernization program. For these interim projects, VA is following the requirements of its User Service Request Handbook, issued in September 1987, that details procedures and required studies for initiating both in-house and contractor system development projects.

During the first phase, VA developed specific goals and measurable objectives for the revised Department of Veterans Benefits Modernization Program. The revised plan also provides for the identification and evaluation of alternatives and the development of an acquisition strategy for the alternative chosen.

In August 1988, VA issued more specific guidance on procedures for ADP and telecommunications systems planning and acquisition than that contained in the handbook. This guidance will be incorporated in the handbook when it is updated. Because the agency is more than 3 years away, at a minimum, from being able to implement modernized systems, it plans to pursue 13 short-term improvement projects to its existing systems supporting the Department of Veterans Benefits. VA is using the newly established procedures that require a needs analysis, requirements analysis, and cost/benefit analysis for alternatives for each project. As of November 1988 the agency had completed a needs analysis and requirements analysis for all 13 projects, and cost/benefit analyses for 10 of the 13 projects.

VA expects the ten short-term projects with completed cost/benefit analyses to cost $81.5 million over their expected life cycle. The agency calculated expected benefits from cost reductions and secondary benefits from improved information handling. The cost/benefit analyses showed that VA had considered from two to seven alternatives for each project, with an average of four. For the ten projects, VA estimated that total

[1]GAO/IMTEC-88-3, Oct. 30, 1987.

discounted benefits were $177 million and total discounted costs were $66 million, resulting in a net discounted benefit of $111 million.

In a related matter, we testified before the House Committee on Veterans' Affairs in July 1988 that VA expects to receive substantial benefits from the interim projects.[2] We cautioned that because these interim projects do not fully address all of the critical shortcomings of VA's existing information systems, they should not be considered a substitute for the modernization program. Thus, care should be taken to ensure that the interim projects do not inappropriately drive the modernization program or its schedule. In the long run, we believe, these shortcomings can best be resolved through modernized systems.

[2]Use of Information Technology by VA's Department of Veterans Benefits (GAO/T-IMTEC-88-6, July 28, 1988).

Action Taken to Improve Other Information Resources Management Activities

Although we made no recommendations in our January 1988 report, we discussed several areas of VA's management of its information resources that needed improvement.[1] At the time of our report, (1) VA's information systems could not efficiently share needed data and duplicate data were being maintained; (2) VA had not conducted required analyses and justification for its future telecommunications needs; and (3) VA had not explored cost-saving opportunities in ADP training. Because the agency had recently initiated corrective actions, we made no recommendations at that time. Since our January report, VA has taken actions in these areas.

VA Making Efforts to Reduce Data Redundancy

We reported that VA had not achieved goals for eliminating duplicate data and increasing data sharing among agency departments. In response VA approved a project to improve data administration by creating a data directory and forming a systems integration review board comprised of various management representatives, whose goal was to identify data sharing opportunities among systems. The agency is also continuing activities to create a Department of Veterans Benefits/ Department of Medicine and Surgery data exchange. The goal of this system would be to expedite the exchange of necessary information among the regional offices and the medical centers.

The Systems Integration Review Board, established in November 1987, was designed to develop management direction, provide guidance, and facilitate problem-solving in VA systems integration projects. The board, chaired by the Associate Deputy Administrator for Management, has management representatives from the three departments and appropriate administrative offices. The board attempts to examine interactions among various systems to identify where data exchanges should occur. If these data exchanges are not in place, the board determines what must be done to remedy the situation. The Associate Deputy Administrator for Management is responsible for ensuring that the board's recommendations are implemented.

According to VA, several problem areas involving data exchanges among the regional offices and the medical centers have been demonstrated. The 58 regional offices are dependent upon a paper-bound system for notification of admissions and discharges by VA medical centers. The 172 medical centers are dependent to a large extent upon this same system for data regarding admissions eligibility and patient examination

[1]GAO/IMTEC-88-17, Jan. 27, 1988.

requests. Problems such as difficulty in determining eligibility and level of service for medical care, and delayed adjustments of benefits for hospitalized veterans, have become evident. To respond to these, VA has proposed a computerized data exchange between the Department of Veterans Benefits and the Department of Medicine and Surgery. The goal of the system modification is to automate the provision of various benefit and eligibility information from the regional offices to the hospitals and accurate notifications of hospitalizations to the regional offices.

The Department of Veterans Benefits has set goals regarding the identification and elimination of duplicate data as part of its modernization program. It hopes to identify all duplicate data elements by the end of 1989 and eliminate a minimum of 60 percent of the duplication by the end of 1992.

Telecommunications Network Studies Completed

We previously reported that VA had not conducted needed analyses for its agency-wide telecommunications network procurement—the Integrated Data Communications Utility. The network is intended to replace its existing Veterans Administration Data Transmission System and encompass other agency telecommunications needs as well. However, VA had not adequately assessed its future telecommunications requirements, nor had it conducted a cost/benefit analysis for the procurement.

Since that time, the agency has reexamined and refined its statement of requirements and incorporated these requirements in its June 15, 1988, request for proposals. VA also conducted a cost/benefit analysis in February 1988 prior to issuing the request for proposals. VA plans to award a contract for its Integrated Data Communications Utility during 1989.[2]

VA Expanding Centralized ADP Training

We also reported that VA had not adequately explored opportunities for expanding the centralization of ADP training within the Department of Veterans Benefits. VA has taken several steps to develop centralized ADP training. First, it prepared a report on the potential for more cost-effective ADP training by reducing the number of locally developed training programs and expanding development at the national level. Second, VA's Central Office has developed several ADP courses and is developing more. Third, it has initiated an end-user assistance service, which provides additional training opportunities to field office staff.

[2]VA has requested a waiver from the General Services Administration to meet its telecommunications requirements outside of the FTS 2000 procurement.

VA has added staff to its training division and has developed three training courses. They include (1) Introduction to Word Processing, (2) Advanced Word Processing, and (3) Introduction to Wang Office Systems. These programs have been tested and are currently available to field offices, and can be taught by field instructors using the course materials. To date, these programs have only been requested by the regional office in Los Angeles. A fourth course, Wang Glossaries, is currently being developed and is scheduled for release in May or June 1989. Along with these courses, VA Central Office is developing a library of training courses that would be available to the field offices on a loan basis. These include both self-tutorial courses and courses that require instructors.

The end-user assistance service was designed to provide extensive training assistance to field activities. In 1988 it conducted five training sessions that focused primarily on developing microcomputer skills for approximately 70 VA field office staff. The consulting staff of the end-user assistance service is the primary contact point and principal adviser to field offices regarding all aspects of training services provided by VA Central Office.

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